

D2 is an air hardening, high carbon, and high chromium heat treatable tool steel characterized by a relatively high attainable hardness. The grades micro structure is rich with chromium alloy carbides providing good resistance to wear with effective toughness properties in a wide variety of tooling applications. D2 is also available as Electro-Slag-Remelted (ESR) which improves chemical homogeneity, refinement of carbide size and improved mechanical and Fatigue properties.

### Typical Composition

Carbon	1.55%
Manganese	0.30%
Silicon	0.35%
Chromium	12.00%
Molybdenum	0.80%
Vanadium	0.90%

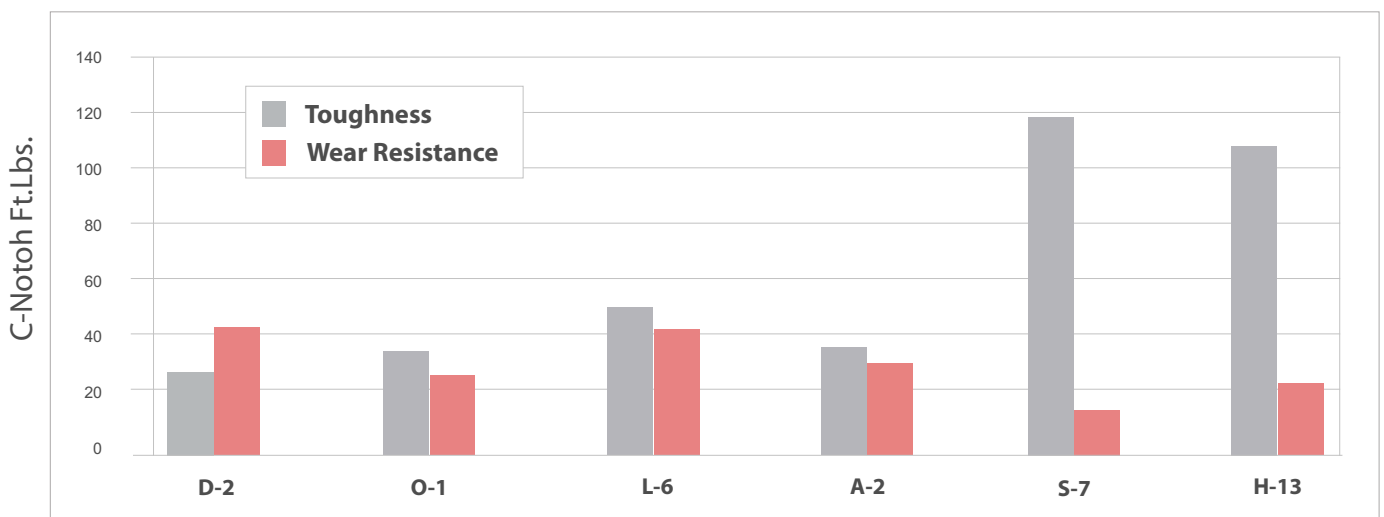
### Common Applications

Rolls	Forming Tools
Punches	Thread Roll Dies
Shear Knives	Draw Dies
Trim Dies	Blanking Dies
Injection Screws	Gages
Food Processing Knives	

### Physical Properties

<b>Density</b>	.0278 lb/in <sup>3</sup> (7695 kg/m <sup>3</sup> )	<b>Modulus of Elasticity</b>	30 psi x 10 <sup>6</sup> (207 GPa)
<b>Specific Gravity</b>	7.70		
<b>Machinability</b>	50% - 60% of 1% carbon steel		

### SB Specialty Metals Tool Steel Comparison



## Heat Treating

### Annealing

Heat to 1600°F (820°C), hold 2 hours, slow cool 25°F (15°C)/hr maximum to 1000°F (540°C), air cool OR heat to 1600°F (820°C), hold 2 hrs, cool to 1425°F (775°C), hold 6 hrs, air cool. Typical annealed hardness is about 221/225 BHN.

### Stress Relieving

Annealed material: Heat to 1200/1250°F (650/675°C), hold two hrs, cool in still air.

Hardened material: Heat to 25/50°F (15/30°C) below original tempering temperature, hold two hours, cool in still air.

### Hardening

Critical Temperature: 1460°F (793°C)

Preheat: Heat to 1100-1200°F (595-650°), equalize, then to 1350-1450°F (775-790°C), equalize.

High heat: 1825-1875°F (995-1025°), hold time at temperature 30-40 minutes.

Quench: Air or positive pressure quench to 150°F (65°C)

Temper: 400-1000°F (205-540°), hold 2 hours at temperature, air cool. Temper twice

### Cryogenic Treating

Refrigeration treatments may improve long term dimensional stability by transforming retained austenite. Perform refrigeration treatments after the first temper, and must be followed by a temper.

## Hardness and Impact Toughness Data

Air Cooled from 1850°F (1010°C)

Treatment Temp.		Hardness HRC	Toughness, Chirpy C-notch	
°F	°C		Ft-lbs	Joules
As Quenched		63	-	-
300	150	62	-	-
400	205	61	17	23
500	260	60	21	29
600	315	59	22	30
700	379	58	22	30
800	425	58	21	29
900	480	58	21	29
1000	540	57	19	26

## Service Center Locations

Location	Phone	Toll Free	Fax	Location	Phone	Toll Free	Fax
Auburn, MA	508-832-5353	800-365-1101	508-832-2217	Meadville, PA	814-337-8804	800-365-0530	814-337-8808
Charlotte, NC	704-372-3073	800-365-1160	704-342-0985	Milwaukee, WI	262-781-6710	800-242-0948	262-781-6743
Chicago, IL	773-772-0300	800-365-1151	773-772-0465	Minneapolis, MN	612-331-6320	800-365-1153	612-331-4137
Dallas, TX	817-649-2800	800-365-1168	817-633-8142				
Dayton, OH	937-885-8400	800-365-1163	937-885-5973				
Detroit, MI	248-528-0332	800-365-1133	248-528-1977				
Huntsville, AL	256-772-0201	800-365-1161	256-772-3361				

**website :** [www.sbsm.com](http://www.sbsm.com)  
**email :** [info@sbsm.com](mailto:info@sbsm.com)